
REMARKS**Claim Amendments**

Claims 11-13 and 15-27 are amended herein. Claim 14 is cancelled.

Mischaracterization of Huang et al.

Applicant contends that the Office Action mischaracterizes the Huang et al. reference.

In general, the Office Action asserts that Huang et al. teaches a digital steganographic watermark of an image that has multiple layers and contains digital machine readable data. *See, e.g.,* Office Action, page 2, last paragraph. While Applicant acknowledges that Huang et al. does indeed provide for a watermark of an image having multiple “layers”, Applicant respectfully maintains that the reference only purports to present a conventional stylized image watermark made up of multiple layers that is humanly perceptible. In other words, Huang et al. only discloses a watermark of a latent image or text that is readable by a human eye (such as a watermark on a piece of high-grade bond paper or on a U.S. dollar bill) and, thus, is non-analogous art to digital steganographic watermarking, which encodes non-human perceptible digital data into an image – the latent watermark image of Huang et al. is not directly usable by a computer or machine as data (i.e., the watermark of Huang et al. is itself a stylized image, and is not encoded digital data, and, if a text image, would require an optical character recognition program to convert it to machine readable/usable digital data). *See, Huang et al., Figures 2-6; Abstract; Paragraphs [0002]-[0003], [0010]-[0014] and [0024]-[0028].*

In contrast, Applicant notes that the reference Davis et al. discloses steganographic digital watermarking as, “. . . methods persistently associate metadata for a media signal by steganographically embedding metadata into the media signal. Steganographic embedding inserts the metadata into the content of the signal itself by subtly altering the media signal such that the alterations are imperceptible or substantially imperceptible to the viewer or listener when the signal is rendered. A specific form of steganographic embedding is digital watermarking.” *See, Davis et al., Paragraph [0005].*

Applicant also maintains that the conventional stylized image watermark of Huang et al. purports to utilize “encoding” utilizing optical effects so that each of the “latent image objects” that make up the watermark in the multiple differing layers can be separately perceptible by the human eye through use of one or more optical filters or optical devices (such as a light filter of a specific color, a lens, a photocopier, or a grating). As such, Huang et al. does not disclose or

suggest digital steganographic encoding that encodes multiple data “layers” or data fields of associated digital metadata of an image into the pixels of the image as it does not disclose or suggest the encoding of digital data that is machine readable and usable in a manner that is not humanly seen as visually altering and is not directly humanly perceivable (regardless of the use an optical filter).

See, e.g., Huang et al., Paragraph [0003] (The structure of a watermark, referred to as carrier dot pattern, is a repetitive pattern with the simplest and most basic as a two-dimensional (“2-D”) dot array. The complexity of the dot pattern structure determines the security level.

Embedding a latent image object into a watermark is implemented by the modulation on the dot pattern with the latent image object. Observing the latent image using a decoder is a process of demodulation. The decoder is also a structured pattern, which corresponds to a particular dot pattern. It is implemented as an optical instrument, such as gratings, lenses, Ronchi Rulings, special films, or even a photocopier.”), and Paragraph [0010] (“The present invention provides a method and apparatus to protect documents from counterfeit and forgery. *It embeds multiple latent image objects into layers of repetitive structures to generate a watermark. The watermark is then incorporated into a document as for example, a seal, logo or background. This may be referred to as an optical watermark.*”). {Emphasis added}

Applicant also specifically notes that Paragraphs [0011] and [0013] of Huang et al., recited in the Office Action as supporting the encoding of multiple digital layers in a watermark, only disclose the embedding and revealing of the differing images or “latent image objects” (such as the text “COPY”) of the multiple layer conventional watermark to the human eye utilizing differing optical devices. *See, e.g., Huang et al., Paragraph [0011] (“An optical watermark has one or several watermark layers. One or two latent image objects are embedded into each watermark layer. Each watermark layer has different structure, as well as a corresponding decoder to observe the latent image object embedded in it. The latent image object embedded in a watermark layer can not be observed by the unaided human eye unless a decoder corresponding to that watermark layer's structure is overlapped onto the watermark. On the other hand, a decoder for one watermark layer will not reveal latent image objects in other watermark layers due to the difference in their structure. As such, decoders can be considered as keys to the secrets, and the secrets are the latent image objects embedded in the watermark.”, and Paragraph [0013] (“The combination of layers of various security levels provides solutions for various applications needs. For example, an optical watermark may appear as the logo of a*

company on a document issued by that company. There can be, for example, three watermark layers. The first layer may be a cancellation word, such as "COPY", and the verification device is the photocopier. The cancellation word "COPY" appears if the printed original document is photocopied. The latent image object in the second layer may be a logo of the company, and the verification device is a specially designed lens with gratings defined by periodical functions. The lens can be given to the related organisations to verify the originality of the document. The third layer may be embedded with a logo of a trusted third party. The verification device is also a lens, but the structure is random dot pattern, which is more secure than the other layers."}. {Emphasis added}

The Office Action also asserts that Davis et al. teaches a digital steganographic watermark of an image that contains digital machine readable data of associated image metadata. *See, e.g.*, Office Action, page 3, last paragraph. While Applicant acknowledges that Davis et al. does indeed provide for a steganographic watermark of a media signal, Applicant respectfully maintains that the reference only purports to present a conventional single layer steganographic watermarking of a media signal. *See*, Davis et al. Paragraphs [0003]-[0006]. Applicant notes that the Office Action itself also admits that Davis et al. only teaches a single data layer steganographic watermark. *See, e.g.*, Office Action, page 3, last paragraph ("Davis explicitly does not disclose 'two or more data layers wherein one or more selected data layers of the two or more data layers of the two or more data layers.'")

Therefore, there is no teaching in the reference, either expressly or inherently, that the apparatus and methods of Huang et al. and Davis et al. are capable of encoding multiple data layers of machine readable or machine usable digital data in a digital steganographic watermark having multiple data layers or data fields in an image, either alone or in combination. The Examiner further provides no support or reasoned statement as to how a user is capable of digitally encoding multiple metadata layers of machine readable digital data associated with an image in a multiple data layer steganographic watermark based on the conventional multi-layer optical watermark of the Huang et al. reference and the conventional single layer steganographic watermarking of media signals of the Davis et al. reference.

In contrast, Applicant has taught and claimed devices to facilitate of digitally encoding multiple metadata layers or metadata fields associated with an image in a machine readable multiple layer steganographic watermark of an image. *See, e.g.*, Specification, Paragraph [0008] ("The various embodiments described herein facilitate steganographic embedding or

watermarking of multiple data fields or data layers (image metadata) in an image or in one or more of the sub-images/objects (component images) contained in the image. . . ."); Paragraph [0012] ("Embodiments of the present invention utilize multiple transform or high coding rate watermarking to embed multiple metadata data fields in an image or in one or more of the objects (the component images) of the image. In one embodiment, images have two or more data fields embedded into them with each data field embedded in watermarks of differing encoding. In another embodiment images have two or more data fields embedded into them with each data field or defined within the same watermark, where the watermark has a high coding rate. In addition, other embodiments include two or more data fields defined within one or more sub-images/objects of the image and each embedded in two or more watermarks of differing encoding or within one watermark at a high coding rate. . . .").

Because the various rejections each rely on the erroneous characterizations of the Huang et al. and Davis et al. references, Applicant contends that the Office has not made a *prima facie* case of obviousness against Applicant's pending claims. Accordingly, and as further detailed below, Applicant contends that the pending claims are patentably distinct from the cited references.

Claim Objections

Claims 12, 13, 15, 16, 17, 19, 20, 22 and 24 were objected to because of informalities. Specifically, the Office Action stated:

Claim 12 is objected to because of the following informalities: "the metadata" in line 1 should be -the digital metadata--. Additionally, "a digital watermark of the image" in lines 2 and 3 should be ---the digital steganographic watermark of the image----. "where the steganographic watermark" in line 4 should be --- wherein the digital steganographic watermark--- Appropriate correction is required.

Claim 13 is objected to because of the following informalities: "the metadata" in line 1 should be -the digital metadata--. Additionally, "a digital watermark of the image" in lines 2-3 should be ---the digital steganographic watermark of the image----. "the watermark" in line 4 should be ---the digital steganographic watermark of the image---- Appropriate correction is required.

Claim 15 is objected to because of the following informalities: "a digital steganographic watermark of the image" in line 2 should be ---the digital steganographic watermark of the image----. Appropriate correction is required.

Claim 16 is objected to because of the following informalities: "digital metadata in a digital steganographic watermark" in line 2 should be --- the digital metadata in the digital steganographic watermark ----. Appropriate correction is required.

Claim 17 is objected to because of the following informalities: "a digital steganographic watermark of the image" in line 2 should be ---the digital steganographic watermark of the image----. Appropriate correction is required.

Claim 19 is objected to because of the following informalities: "a digital steganographic watermark" in line 2 should be ---the digital steganographic watermark - ---. Appropriate correction is required.

Claim 20 is objected to because of the following informalities: "a digital steganographic watermark" in lines 2 and 4 should be ---the digital steganographic watermark ----. Appropriate correction is required.

Claim 22 is objected to because of the following informalities: "a digital steganographic watermark" in line 2 should be ---the digital steganographic watermark - ---. Appropriate correction is required.

Claim 24 is objected to because of the following informalities: "a digital steganographic watermark of the image" in lines 2-4 should be --- the digital steganographic watermark of the image --- Appropriate correction is required.

Claims 12, 13, 15, 16, 17, 19, 20, 22 and 24 have been amended as suggested by the Examiner. As such, Applicant requests reconsideration and withdrawal of the objection to claims 12, 13, 15, 16, 17, 19, 20, 22 and 24.

Claim Rejections Under 35 U.S.C. § 103

Claims 11-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Davis et al. (U.S. Publication No. 2002/0001395A1) in view of Huang et al. (U.S. Publication No. 2002/0054680). Applicant respectfully traverses this rejection and submits that claims 11-27 are allowable for the following reasons.

Applicant disagrees with the Office Action's characterizations of Davis et al. and Huang et al., however, in the interest of furthering prosecution, Applicant has amended the claims to clarify that the digital metadata associated with each sub-image or two or more sub-images of the image is encoded in separate sub-watermarks of the digital steganographic watermark, or that the digital metadata associated with each sub-image of two or more sub-images is encoded in a digital steganographic watermark encoded in the selected sub-image.

As stated above, Applicant respectfully maintains that the Office Action mischaracterizes the reference Huang et al. and continues to respectfully maintain that Huang et al. discloses traditional latent image print watermarks that are human perceivable using optical light filters and lenses and therefore does not teach or disclose steganographic digital watermarks that steganographically encode digital data that can be directly read and utilized by a machine. *See*, Huang et al., Figures 2-6; Abstract; Paragraphs [0002]-[0003], [0010]-[0014] and [0024]-[0028].

In addition, Applicant respectfully submits, as noted above, that Paragraphs [0011] and [0013] of Huang et al. specifically cited by the Examiner do not teach two or more data layers, but the overlaying of two or more traditional optical watermarks out of two or more print image layers. In support of this, Applicant notes paragraph [0013] of Huang et al. which states, “[0013] The combination of layers of various security levels provides solutions for various applications needs. For example, an optical watermark may appear as the logo of a company on a document issued by that company. There can be, for example, three watermark layers. The first layer may be a cancellation word, such as "COPY", and the verification device is the photocopier. The cancellation word "COPY" appears if the printed original document is photocopied. The latent image object in the second layer may be a logo of the company, and the verification device is a specially designed lens with gratings defined by periodical functions. The lens can be given to the related organizations to verify the originality of the document. The third layer may be embedded with a logo of a trusted third party. The verification device is also a lens, but the

structure is random dot pattern, which is more secure than the other layers.” *See*, Huang et al., Figures 1-6; and Paragraphs [0011]-[0014].

Applicant respectfully submits that a person of ordinary skill in the art would not consider multiple layer traditional latent image optical watermarks as being related to steganography or as disclosing digital steganographic watermarks that contain multiple sub-watermarks and encode digital machine usable data steganographically.

Applicant therefore respectfully submits that Huang et al. fails to teach or suggest a method that encodes the digital metadata associated with each sub-image or two or more sub-images of the image is encoded in separate sub-watermarks of the digital steganographic watermark, or that the digital metadata associated with each sub-image of two or more sub-images is encoded in a digital steganographic watermark encoded in the selected sub-image and thus does not disclose or suggest all elements of independent claims 11, 18, and 23.

The Office Action also asserts that Davis et al. teaches a digital steganographic watermark of an image that contains digital machine readable data of associated image metadata. *See, e.g.*, Office Action, page 3, last paragraph. While Applicant acknowledges that Davis et al. does indeed provide for a steganographic watermark of a media signal, Applicant respectfully maintains that the reference only purports to present a conventional single layer steganographic watermarking of a media signal. *See*, Davis et al. Paragraphs [0003]-[0006]. Applicant notes that the Office Action itself also admits that Davis et al. only teaches a single data layer steganographic watermark. *See, e.g.*, Office Action, page 3, last paragraph (“Davis explicitly does not disclose ‘two or more data layers wherein one or more selected data layers of the two or more data layers of the two or more data layers.’”)

In addition, Applicant respectfully continues to maintain that Davis et al. discloses a “steganographic embedder” that “associates data with a media signal by encoding the data, a link to the data, or a combination of both into the media signal. The embedder may be located in an media signal capture device or an external process or device.” *See*, Davis et al., Abstract. In this, Applicant respectfully maintains that Davis et al. only purports to present a conventional single layer steganographic watermarking of a media signal. *See*, Davis et al. Paragraphs [0003]-[0006]. Applicant notes that the Office Action itself also admits that Davis et al. only teaches a single data layer steganographic watermark. *See, e.g.*, Office Action, page 3, last paragraph (“Davis explicitly does not disclose ‘two or more data layers wherein one or more selected data layers of the two or more data layers of the two or more data layers.’”)

In addition, Applicant has carefully reviewed Davis et al. and respectfully maintains that Davis et al. also does not disclose or suggest encoding digital metadata associated with each sub-image or two or more sub-images of the image is encoded in separate sub-watermarks of the digital steganographic watermark, or encoding digital metadata associated with each sub-image of two or more sub-images is encoded in a digital steganographic watermark in the selected sub-image and not the image as a whole, as required by the Applicant's claimed invention. *See*, Davis et al., Abstract; Paragraphs [0024]-[0028], [0090]-[0096], [0100]-[0137], [0176]-[0185], [0206], [0002], [0003], [0015], and [0018].

As such, Applicant contends that Davis et al. discloses apparatus and methods of associating digital metadata with images and media signals to be steganographically encoded in the image or media signal. In this, as admitted by the Office Action, Applicant contends that Davis et al. only discloses steganographically encoding the metadata in a single steganographic watermark of an image and does not disclose or suggest the digital metadata associated with each sub-image or two or more sub-images of the image is encoded in separate sub-watermarks of the digital steganographic watermark, or that the digital metadata associated with each sub-image of two or more sub-images is encoded in a digital steganographic watermark encoded in the selected sub-image.

Applicant also contends that there is no suggestion to modify the reference in the manner detailed by the Office Action. Specifically, Applicant contends that to modify the steganographical encoding of metadata in a single steganographic watermark of an image of Davis et al. with Huang et al.'s latent image print watermarks with multiple layers that are each humanly perceptible using different optical light filters and lenses would require a modification of Huang et al. to teach or disclose steganographic digital watermarks that steganographically encode digital data that can be directly read and utilized by a machine or a modification of Davis et al. to teach or disclose encoding the digital metadata associated with each sub-image or two or more sub-images of the image in separate sub-watermarks of the digital steganographic watermark or encoding the digital metadata associated with each sub-image of two or more sub-images in a digital steganographic watermark encoded in the each separate sub-image. As detailed above, Applicant finds no suggestion to modify the operation of Davis et al. expressly or impliedly contained in the Huang et al. reference, and the Office Action does not provide a convincing line of reasoning as to why an artisan would have found the claimed invention to have been obvious in light of the teachings of the references. Applicant thus submits that the

Office has also failed to meet its burden of establishing a *prima facie* case of obviousness. See MPEP § 706.02(j) (“To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.’ *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).”). Applicant therefore respectfully contends that the Examiner has not met the burden of establishing a *prima facie* case of obviousness in regards to independent claims 11, 18, and 23.

Applicant therefore respectfully maintains that combining the elements of Huang et al. with Davis et al. also fails to teach and suggest the digital metadata associated with each sub-image or two or more sub-images of the image is encoded in separate sub-watermarks of the digital steganographic watermark, or that the digital metadata associated with each sub-image of two or more sub-images is encoded in a digital steganographic watermark encoded in the selected sub-image. As such, Davis et al. and Huang et al. fail to teach or suggest all elements of independent claims 11, 18, and 23, either alone or in combination.

Applicant respectfully contends that claims 11, 18, and 23 as pending have been shown to be patentably distinct from the cited references, either alone or in combination. As claims 12-13, 15-17, 19-22 and 24-27 depend from and further define claims 11, 18, and 23, respectively, they are also considered to be in condition for allowance. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 11-13 and 14-27.

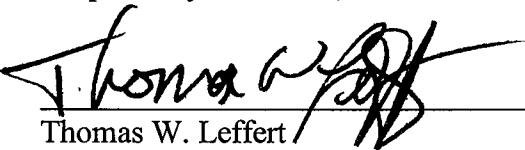
CONCLUSION

In view of the above remarks, Applicant believes that all pending claims are in condition for allowance and respectfully requests a Notice of Allowance be issued in this case. Please charge any further fees deemed necessary or credit any overpayment to Deposit Account No. 08-2025.

If the Examiner has any questions or concerns regarding this application, please contact the undersigned at (612) 312-2204.

Respectfully submitted,

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